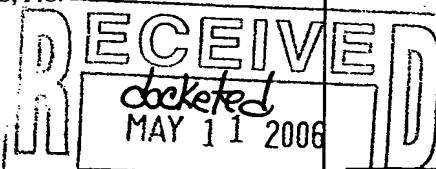


# PATENT COOPERATION TREATY

From the  
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:  
LEON R. YANKWICH  
YANKWICH & ASSOCIATES, P.C.  
201 BROADWAY  
CAMBRIDGE, MA 02139



*MRW*  
REC  
**PCT**

NOTIFICATION OF TRANSMITTAL OF  
INTERNATIONAL PRELIMINARY  
REPORT ON PATENTABILITY  
(Chapter II of the Patent Cooperation Treaty)

(PCT Rule 71.1)

Date of mailing  
(day/month/year)

**08 MAY 2006**

Applicant's or agent's file reference

AVA-434.3 PCT

## IMPORTANT NOTIFICATION

|                               |  |                                |
|-------------------------------|--|--------------------------------|
| International application No. | International filing date (day/month/year) | Priority date (day/month/year) |
| PCT/US04/41282                | 09 December 2004 (09.12.2004)              | 02 April 2004 (02.04.2004)     |

Applicant

AVANT IMMUNOTHERAPEUTICS, INC.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary report on patentability and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

#### 4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices)(Article 39(1))(see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the *PCT Applicant's Guide*.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed invention is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

Name and mailing address of the IPEA/ US  
Mail Stop PCT, Attn: IPEA/US  
Commissioner for Patents  
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Authorized officer

Lakia Tongue

Telephone No. 571-272-2921

Form PCT/IPEA/416 (January 2004)

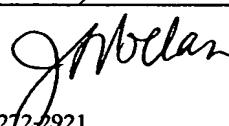
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# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

|  |  |   |
|--|--|---|
| Applicant's or agent's file reference<br><b>AVA-434.3PCT</b>   | FOR FURTHER ACTION   | See Form PCT/IPEA/416   |
| International application No.<br><b>PCT/US04/41282</b>   | International filing date (day/month/year)<br><b>09 December 2004 (09.12.2004)</b>   | Priority date (day/month/year)<br><b>02 April 2004 (02.04.2004)</b> |
| International Patent Classification (IPC) or national classification and IPC<br><b>IPC(S): A01N 63/00; A01N 65/00 and US Cl.: 424/93.1; 424/93.2</b>   |  |   |
| Applicant<br><b>AVANT IMMUNOTHERAPEUTICS, INC.</b>   |  |   |
| <p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of <b>19</b> sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input type="checkbox"/> (sent to the applicant and to the International Bureau) a total of <b>      </b> sheets, as follows:</p> <p><input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) <b>      </b>, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p> <p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the report</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p> |  |   |
| Date of submission of the demand<br><b>05 November 2005 (05.11.2005)</b>   | Date of completion of this report<br><b>23 January 2006 (23.01.2006)</b>   |   |
| Name and mailing address of the IPEA/ US<br>Mail Stop PCT, Attn: IPEA/US<br>Commissioner for Patents<br>P.O. Box 1450<br>Alexandria, Virginia 22313-1450<br>Facsimile No. (571) 273-3201   | <p>Authorized officer<br/><b>Lakia Tongue</b><br/></p> <p>Telephone No. <b>571-272-2921</b></p> |   |

Form PCT/IPEA/409 (cover sheet)(April 2005)

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## Box No. I Basis of the report

1. With regard to the language, this report is based on:
  - the international application in the language in which it was filed.
  - a translation of the international application into English, which is the language of a translation furnished for the purposes of:
    - international search (under Rules 12.3 and 23.1(b))
    - publication of the international application (under Rule 12.4(a))
    - international preliminary examination (under Rules 55.2(a) and/or 55.3(a))
2. With regard to the elements of the international application, this report is based on (*replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report*):
  - the international application as originally filed/furnished
  - the description:
 

pages 1-33 as originally filed/furnished  
 pages\* NONE received by this Authority on \_\_\_\_\_  
 pages\* NONE received by this Authority on \_\_\_\_\_
  - the claims:
 

pages 34-36 as originally filed/furnished  
 pages\* NONE as amended (together with any statement) under Article 19  
 pages\* NONE received by this Authority on \_\_\_\_\_  
 pages\* NONE received by this Authority on \_\_\_\_\_
  - the drawings:
 

pages 1-5 as originally filed/furnished  
 pages\* NONE received by this Authority on \_\_\_\_\_  
 pages\* NONE received by this Authority on \_\_\_\_\_
  - a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3.  The amendments have resulted in the cancellation of:
  - the description, pages \_\_\_\_\_
  - the claims, Nos. \_\_\_\_\_
  - the drawings, sheets/figs \_\_\_\_\_
  - the sequence listing (*specify*): \_\_\_\_\_
  - any table(s) related to the sequence listing (*specify*): \_\_\_\_\_
4.  This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
  - the description, pages \_\_\_\_\_
  - the claims, Nos. \_\_\_\_\_
  - the drawings, sheets/figs \_\_\_\_\_
  - the sequence listing (*specify*): \_\_\_\_\_
  - any table(s) related to the sequence listing (*specify*): \_\_\_\_\_

\* If item 4 applies, some or all of those sheets may be marked "superseded."

Form PCT/IPEA/409 (Box No. I) (April 2005)

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## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/US04/41282

## Box No. IV Lack of unity of invention

1.  In response to the invitation to restrict or pay additional fees the applicant has, within the applicable time limit:
  - restricted the claims.
  - paid additional fees.
  - paid additional fees under protest, and, where applicable, the protest fee
  - paid additional fees under protest but the applicable protest fee was not paid
  - neither restricted the claims nor paid additional fees
2.  This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is:
  - complied with.
  - not complied with for the following reasons:
4. Consequently, this report has been established in respect of the following parts of the international application:
  - all parts
  - the parts relating to claims Nos. \_\_\_\_\_

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/US04/41282

## Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

## 1. Statement

|                               |                    |     |
|-------------------------------|--------------------|-----|
| Novelty (N)                   | Claims <u>1-15</u> | YES |
|                               | Claims <u>NONE</u> | NO  |
| Inventive Step (IS)           | Claims <u>NONE</u> | YES |
|                               | Claims <u>1-15</u> | NO  |
| Industrial Applicability (IA) | Claims <u>1-15</u> | YES |
|                               | Claims <u>NONE</u> | NO  |

## 2. Citations and Explanations (Rule 70.7)

Claims 1-11 and 13-15 lack an inventive step under PCT Article 33(3) as being obvious over Curtiss, III et al. Curtiss et al disclose mutated microorganism wherein the vector is a plasmid, the gene is an antigen and the microorganism is an attenuated bacterium from *Salmonella* sp. The mutation is selected from the *cya*, *crp*, *phoPQ*, *opmR*, *gale*, *cdt*, *hem A*, *aroA*, *aroC*, *aroD* and *htrA*.

Claims 1-15 lack an inventive step under PCT Article 33(3) as being obvious over Akzo et al. Akzo disclose the use of attenuated bacteria in a medicament. The vaccine is based upon bacteria useful for the prevention of microbial pathogenesis. In addition Akzo et al also disclose the use of such bacteria as well as a method of preparation.

Claims 1-15 lack an inventive step under PCT Article 33(3) as being obvious over Garmory et al. Garmory et al disclose oral immunization with live *aroA* attenuated *Salmonella enterica* serovar *Typhimurium*, which expresses the *Yersinia pestis* V antigen and protected mice against the plague.

Claims 1-15 lack an inventive step under PCT Article 33(3) as being obvious over Lowery et al. Lowery et al disclose attenuated mutant *Salmonella* bacteria for use in vaccines.

Claims 1-15 lack an inventive step under PCT Article 33(3) as being obvious over Titball et al. Titball et al disclose a method of protecting a human or animal from infection with *Y. pestis*.